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Office of the Secretary

# Broadband Networking: What is Broadband?

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Disclaimer: The views expressed herein are those of the authors and do not necessarily represent those of Telcordia Technologies or the Laboratory for Telecommunication Sciences (LTS).

# Bits, Bytes, the Hierarchy

- **Bits** = Building blocks of information, 0s and 1s
- **Bytes** = characters or 8 bits (sometimes 9 or 10 depending on parity)
- **Data** = raw bits and bytes (pixels on a weather map)
- **Information** = Aggregation of bits and bytes that form useful groups  
(words, sentences, books, etc.) (Weather map)
- **Knowledge** = Aggregation of information with some analysis  
(Detailed weather forecast)
- **Wisdom** = Use of knowledge for good purpose  
Decision not to play tennis today due to the weather

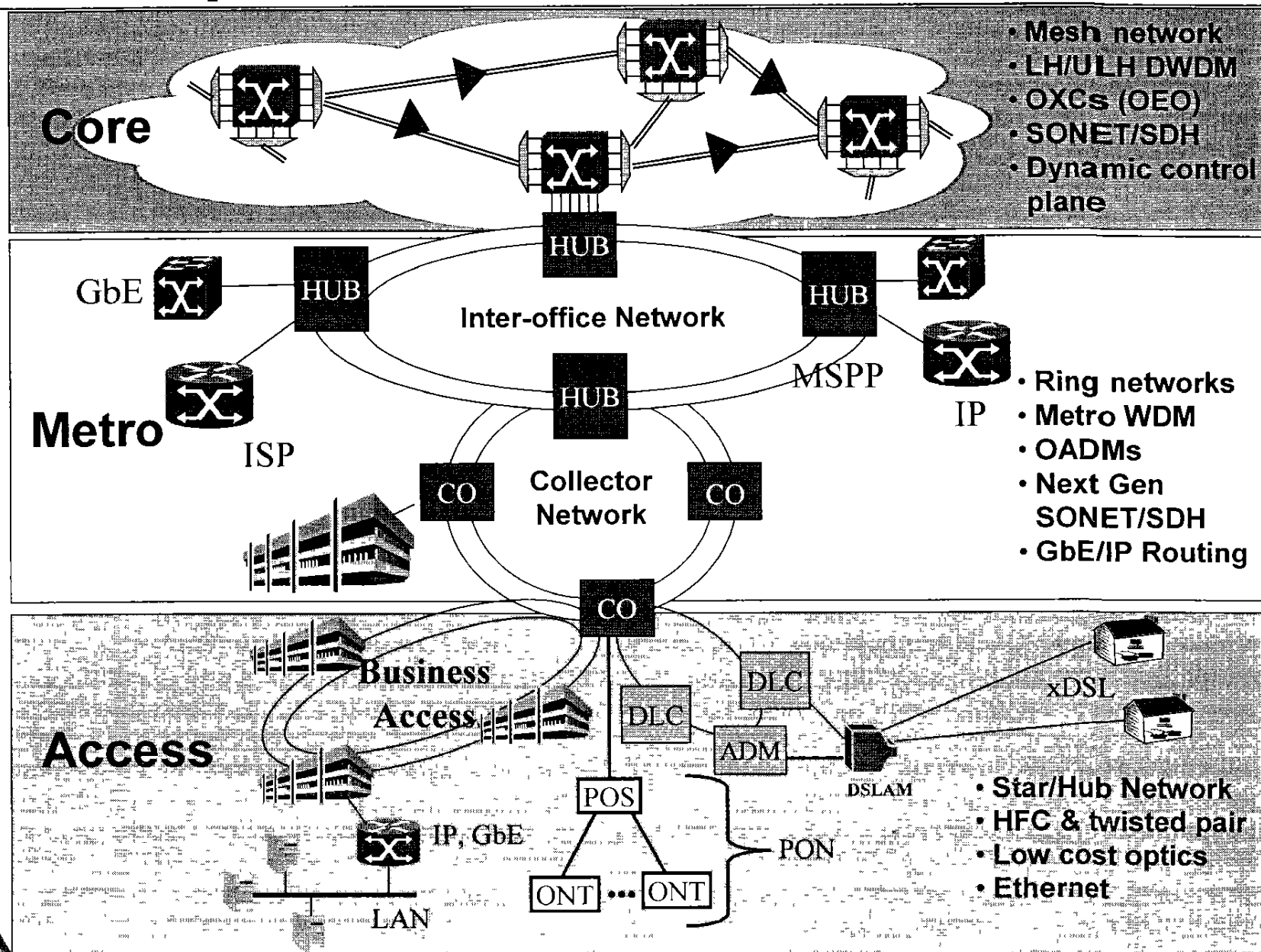


# How Big is a Gigabit?

- Consider a book (all text, no pictures, 400 pages)
- Assume 10 bits/character x 80 char/line x 60 lines/page x 400 pages
- 1 Book = 19.2 Mbits
- 50 Books = 1 Gbit (1 Billion Bits)
- 10 Gbit/s transmission = 500 (400 page) books/s
- CD contains about 6.5 Gbit of information
- DVD contains about 50-90 Gbit



# Transport Network Architecture



# Optical Transmission Progress

- Starting from the late-1980s, commercial optical transmission systems have increased in capacity from 1.6 Gb/s per fiber to over 1.6 Tb/s per fiber today—an increase in capacity of 3 orders of magnitude (1000x)
- Today, researchers have already demonstrated experimental optical Dense Wavelength Division Multiplexing (DWDM) optical transmission that exceed 10 Tb/s capacity on a single fiber
- Over the next decade, it is feasible that commercially available systems may be able to achieve nearly 20 Tb/s capacity on a single optical fiber—a mere increase of only 1 order of magnitude over today's commercial systems
- Individual users (small businesses and residences) may access this bandwidth in the next 10 years using 1 Gb/s data connections—for example Gigabit Ethernet or equivalent technology



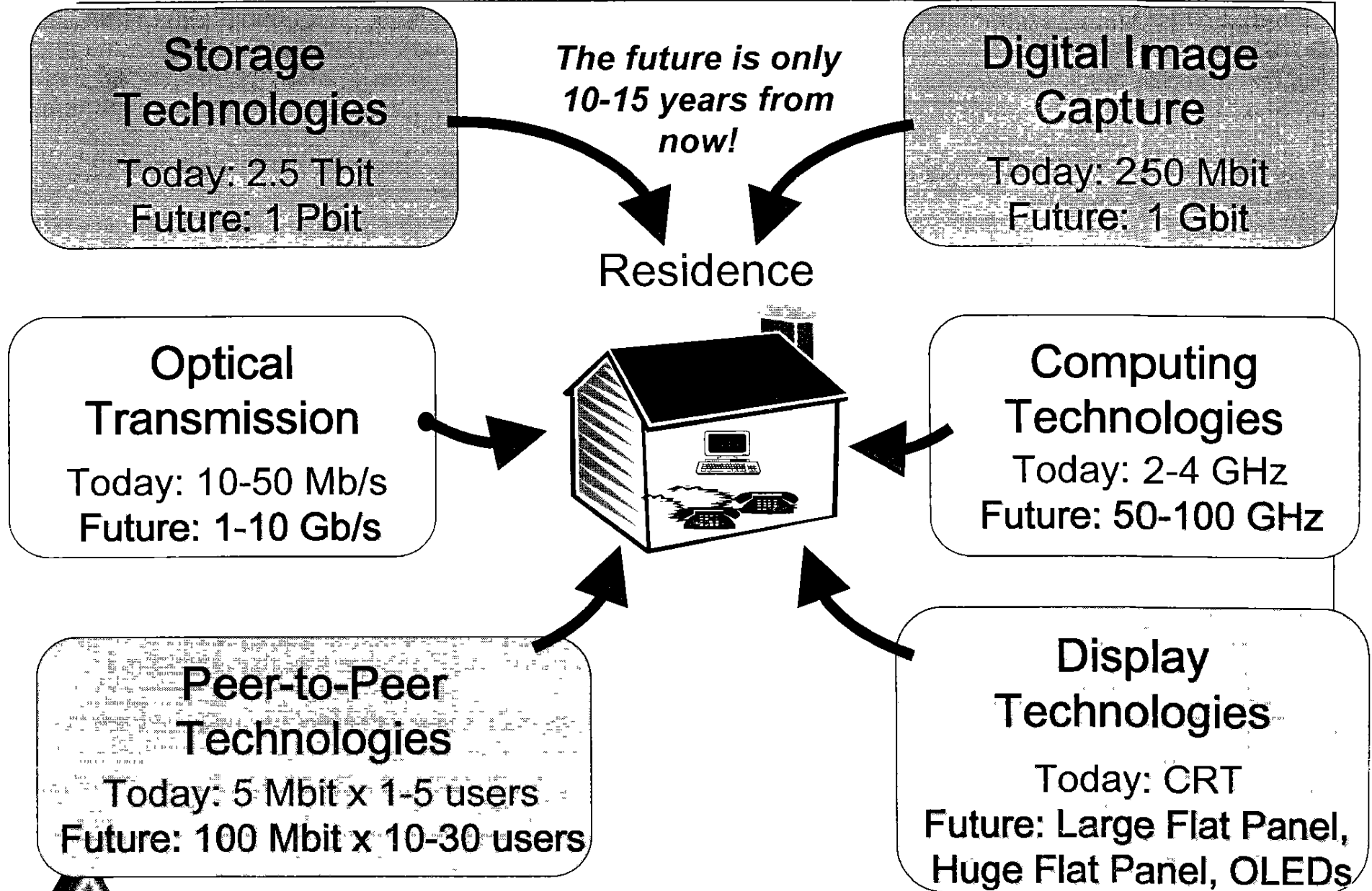
## **What you will see today at the LTS:**

- “Standard NTSC quality TV
  - Video Teleconferencing at 1.5 Mbit/s, 6 Mbit/s, 12 Mbit/s and 18 Mbit/s
  - Compressed HDTV (approx 20 Mbit/s)
  - Raw Uncompressed HDTV at 1.5 Gbit/s
  - Application of High Data Rate Technology
- 
- + Tour of High Performance Optical Networking Research

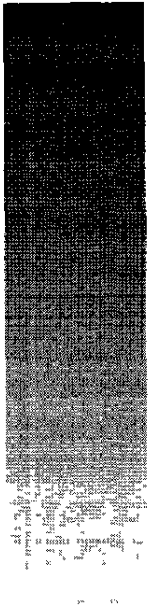




# Convergence of Technologies to High Data Rates







**Thank you!**